North American Amphibian Monitoring Program (NAAMP) Indiana Volunteer Manual

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Welcome to the North American Amphibian Monitoring Program (NAAMP). NAAMP is a collaborative effort among regional partners, such as state natural resource agencies and nonprofit organizations, and the U.S. Geological Survey (USGS) to monitor populations of vocal amphibians. The USGS provides central coordination and database management. The regional partners recruit and train volunteer observers, like you, to collect amphibian population data, following the protocol of NAAMP.

In Indiana, NAAMP is coordinated by staff in the Wildlife Diversity Section (WDS) of the Indiana Department of Natural Resources' Division of Fish and Wildlife. The WDS is responsible for the conservation and management of Indiana's more than 750 species of nongame and endangered fish and wildlife. This program is supported entirely through public donations to Indiana's Nongame Fund and the State Wildlife Grants program administered through the U.S. Fish and Wildlife Service.

The mission of NAAMP is to monitor calling amphibians to assess population changes over time. Data from your route contributes to looking at the big picture of amphibian populations. NAAMP data can also be used to update distribution maps for amphibian species and increase our understanding of breeding chronology.

Thank you for your participation in the survey, NAAMP would not be possible without our volunteers. This Volunteer Manual has been created to provide Indiana volunteers with information on how to collect survey data, how to submit data, Indiana species (what species are found where in the state and when each species calls) and the NAAMP Quiz.

Tips for NAAMP Volunteers

- Safety first! Never collect data in unsafe conditions.

- Bring a friend – volunteers who regularly bring someone with them to monitor are more likely to complete their responsibilities.

- Drive your route once in the daytime before the start of each amphibian monitoring season.

- What are the minimum annual requirements to be a volunteer?
  - ✓ Learn the calls of Indiana's frogs and toads
  - ✓ Complete the Frog Call Quiz
  - ✓ Collect data at least once per sampling window
  - ✓ Enter data into the database by September 15th
  - ✓ Follow all national protocols for data collection and data entry

- What to bring when you are monitoring:
  - ✓ Clipboard
  - ✓ Thermometer
  - ✓ Pencil
  - ✓ Datasheet
  - ✓ Flashlight
  - ✓ Notes to ID species calls

NAAMP Protocols

A unified protocol is needed to reach our primary goal, to unite our data for population trends at multiple levels. All volunteers are required to collect data the same way.

Route Creation

Routes are generated in a stratified random block design at USGS Patuxent Wildlife Research Center. These roadside routes are then groundtruthed to determine suitability (not too dangerous, not too noisy to hear) and stop placement. There are 10 stops per route. Routes in Indiana are stratified by habitat, the stops are at least 0.5 miles apart and are located at wetland habitats. The wetland habitat should be appropriate potential habitat (pond, vernal pool, roadside ditch, etc) but the presence or absence of amphibians should not be used as a selection factor. Some alteration of the route may occur during groundtruthing, see Groundtruthing Guidelines for more information. Stop locations and any route alterations should be shared with NAAMP to keep route maps accurate and up to date. Once a route has been groundtruthed and the 10 stops determined the route and stops are not changed, unless exceptional circumstances occur, see Stop Inaccessibility, Stop Relocation, and Stop Retirement section of this document.

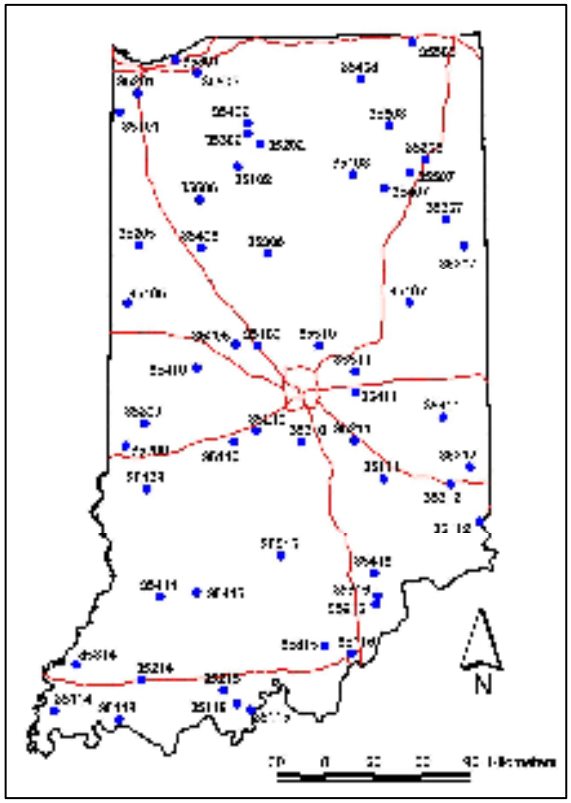


Figure 1. Indiana's 56 NAAMP routes.

Seasonal Sampling Windows

There are three sampling windows (also referred to as "runs" or "periods") to cover the calling phenology (the annual cycle of when each species calls) of Indiana's local species. The sampling periods are created to target the peak vocalization times for early-, mid- and late-season breeding amphibians and to assist observers in understanding when to collect data. States are permitted to adjust the sampling dates each year to account for an early or late arrival of the calling season. Volunteers should collect data for their assigned route at least once per sampling window and can only collect data when the air temperature is above the established minimum for 8 of 10 stops.

Table 1. Indiana's sampling windows and minimum temperature for collecting data. Air temperature is recorded at every stop on a survey. If the windows change (i.e., it is not higher than 45 degrees by 3/31) you will be contacted by Regional Coordinators.

Window	Dates	Minimum Temperature
1	2/21 – 3/31	42° F (5.6°C)
2	4/15 – 5/15	50° F (10°C)
3	6/1 – 6/30	55° F (12.8°C)

Nightly Sampling Conditions

A survey must begin 30 minutes after sunset or later. No matter what time a route is started, it should be completed by 1 a.m. Appropriate sampling conditions are based upon wind, sky, and air temperature conditions. For most regions, including Indiana, the Beaufort wind code should be at level 3 or less. Surveys should not be conducted during heavy rainfall, but light rainfall is acceptable (sound of the rain may impair hearing ability). Sampling should occur during "good frog weather". The following list is ordered from "best" weather to adequate weather. 1) During the light drizzle after the first thunderstorm of the sampling window, 2), After an afternoon thunderstorm when the roads are still wet 3) within 3 days of rain, 4) humid nights, 5) any night within the sampling window where temperatures are above the minimum required.

Table 2. Beaufort Wind Codes. This code is used to standardize weather data. The code should be recorded at the Start and Finish of every survey.

Beaufort Wind Codes	
0	Calm (<1mph) Smoke rises vertically
1	Light Air (1-3 mph) smoke drifts, weather vane inactive
2	Light Breeze (4-7 mph) leaves rustle, can feel wind on face
3	Gentle Breeze (8-12 mph) leaves and twigs move around, small flags extend
4*	Moderate Breeze (13-18 mph) moves thin branches, raises loose papers * Do not conduct survey at Level 4, unless in Great Plains
5**	Fresh Breeze (19 mph or greater) small trees begin to sway ** Do not conduct survey at Level 5 in ALL REGIONS

Table 3. Sky Codes. This code is used to standardize weather data. The code should be recorded at the Start and Finish of every survey.

Sky Codes (note 3 and 6 are not valid code numbers)	
0	Few Clouds
1	Partly cloudy (scattered) or variable sky
2	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain (not affecting hearing ability)
7	Snow
8	Showers (is affecting hearing ability). Do not conduct survey

Data Collection

Stops are visited in numerical order (Start at Stop 1 and End at Stop 10), in one night by one observer. One observer is the official recorder of the route whose data will be entered into the NAAMP database. This "one observer per datasheet" rule allows each survey conducted to be of equal effort. For safety reasons we highly encourage volunteers to bring along a friend or significant other. This person can record data (weather, number of cars) but should not be consulted about calling species before data are recorded. All datasheets are returned to the Regional Coordinator for archival purposes.

What to record at the Start and Stop of every survey
Observers record the time, sky code, and wind code, at the beginning and end of each survey to verify that the sampling conditions were met on the evening of the survey.

What to record at EVERY Stop

1. At each Stop, air temperature is recorded to verify that sampling conditions were met on the sampling night; at least 8 of the 10 stops must meet temperature guidelines.
2. The time at the start of the 5 minute listening period should be recorded.
3. At each Stop, the observer listens for 5 minutes, and then records the amphibian calling index for each species heard.
4. It is required to record the number of cars that passed during the listening period and whether the moon or moonlight was visible. If no cars are seen enter a "0" and if the moonlight is not visible enter an "N". If nothing is entered it will be assumed that this data was not collected.
5. The observer indicates whether background noise impaired his/her ability to hear. If there is a major noise disturbance, lasting one minute or longer, the observer may break the listening period to avoid sampling during the excessive noise. If such a time out is taken, this is noted on the datasheet. After the major disturbance ends, the observer resumes listening for the time remaining. The time out should not be used for background noise.

Table 4. Amphibian Calling Index. Observers record a 1, 2 or 3 for every species calling at every stop. The index is a measure of abundance – you do not need to count the number of individuals calling.

Amphibian Calling Index	
1	Individuals can be counted; there is space between calls
2	Calls of individuals can be distinguished but there is some overlapping of calls
3	Full chorus, calls are constant, continuous and overlapping

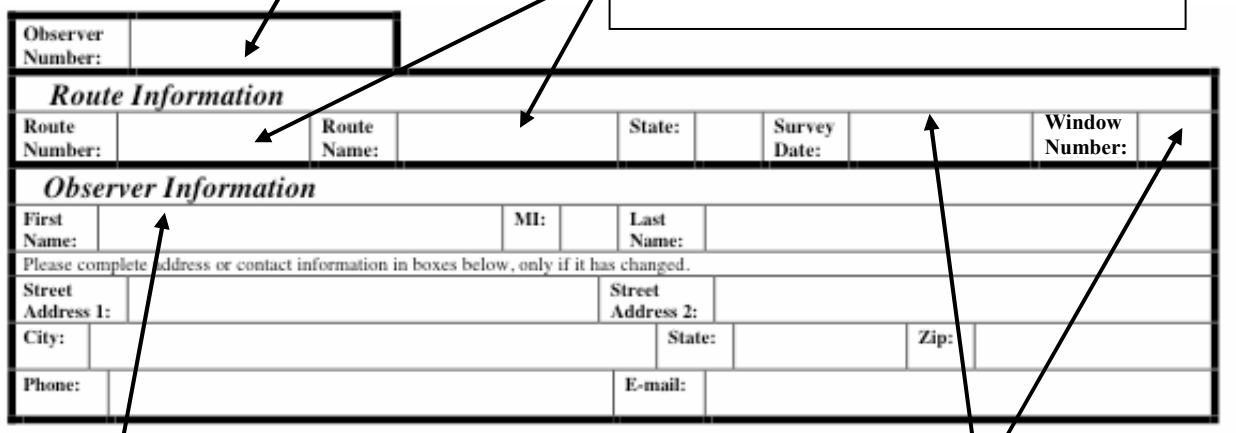
Data Sheet

The following are different parts of the datasheet with explanations for how to complete each section.

The front of the datasheet has all the information you will need to collect data including the sampling windows, minimum temperatures, amphibian calling index, sky and wind codes. In addition there is a place for notes and contact information for the Regional Coordinators. There is also a box of information for you to fill out on Route and Observer information.

Always enter your **Observer Number** on the datasheet. The Regional Coordinator gives this number to you. It is the first letter of your last name followed by 4 digits.

All Indiana routes start with 35 and have a total of 6 digits. The Regional Coordinator gives the **route number and name** to you. Routes names generally are based on the town closest to the Start of the route.



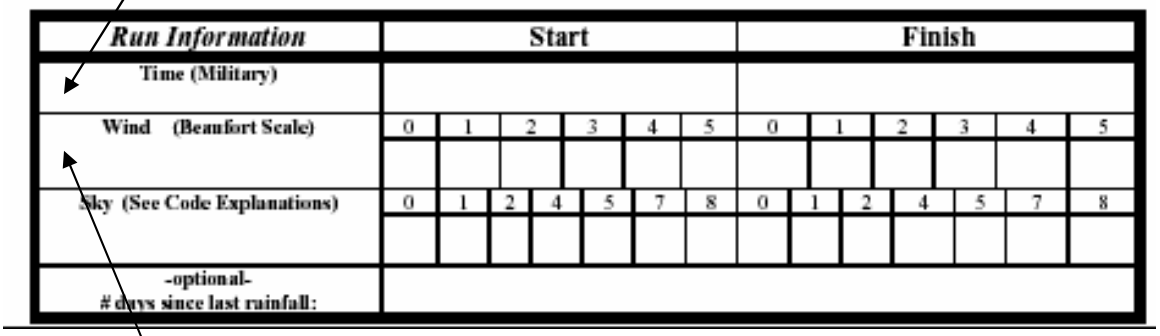
Observer Number:									
Route Information									
Route Number:		Route Name:		State:		Survey Date:		Window Number:	
Observer Information									
First Name:		MI:		Last Name:					
Please complete address or contact information in boxes below, only if it has changed.									
Street Address 1:				Street Address 2:					
City:			State:		Zip:				
Phone:			E-mail:						

Put your name on every datasheet. Fill out other information about yourself if it has changed since the last time you collected data.

The Survey Date and Window Number are required to be sure data collection occurred during an established sampling window.

The back of the datasheet is where you will record all weather and amphibian observations each time you collect data. The first box is for the information you collect at the **Start and Finish** of every route. The second box is for recording the information you will collect at **every Stop**.

All times should be recorded using military time (where noon is 12:00 and 11 pm is 23:00). Start time is at least 30 minutes after sunset and is the same time as your Stop 1 start time. Stop time must be before 1 a.m. and is 5 minutes later than your start time for Stop 10.



Run Information	Start							Finish						
Time (Military)														
Wind (Beaufort Scale)	0	1	2	3	4	5		0	1	2	3	4	5	
Sky (See Code Explanations)	0	1	2	4	5	7	8	0	1	2	4	5	7	8
-optional- # days since last rainfall:														

Use the Sky and Wind Codes to determine which box to check. Check only ONE box at the start and ONE box at the Finish of the route for both wind and sky. If you know the last time it rained enter the number of days in the last line.

This is an example of a completed Run Information box on the datasheet:

Run Information	Start							Finish						
Time (Military)	2034							2155						
Wind (Beaufort Scale)	0	1	2	3	4	5		0	1	2	3	4	5	
		X						X						
Sky (See Code Explanations)	0	1	2	4	5	7	8	0	1	2	4	5	7	8
		X							X					
-optional- # days since last rainfall:	2													

In the **Per Stop Information** you must record the Start Time and Temperature for EVERY STOP. You should double check to see that your Start times for the Run and Stop 1 are the same and that your Start time for Stop 10 is 5 minutes before the Finish time for the Run. During a survey night, please be sure to use the same watch or clock for all your times. Otherwise, it may appear that you did not listen for full 5 minutes.

Per Stop Information										
Stop #	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Start Time (Military)										
Air Temperature *Circle Scale:* °C °F										
Was noise a factor? (check if yes)										
Did you take a time-out? (check if yes)										

You should indicate if background noise impaired your ability to hear by checking the "Was noise a factor" box. If there is a major noise disturbance, lasting one minute or longer, you may break the listening period to avoid sampling during the excessive noise. If such a time out is taken, this is noted on the datasheet. After the major disturbance ends, the observer resumes listening for the time remaining. The time out should not be used for background noise. Time outs should be very rare.

The datasheet lists all 17 species and "unknown gray treefrog". You can select unknown gray treefrog anytime you are unsure about which of the two species is calling. Use the amphibian calling index to **assign a 1, 2 or 3 for each species you hear at every stop**. Remember that you should pick the appropriate index value for each species. For example, you may enter a 1 for one species and a 3 for another at the same stop. In addition, you may enter a 1 for one species at a stop but a 2 for the same species at a different stop. You do not have to mark anything for stops with no calls or species not calling.

This is not a test for school! Feel free to bring along any notes you have made to help you distinguish calls.

You should record data for all calls you hear, even if they are not calling right by the road. Everything you can hear is data for that stop, whether it sounds nearby or far away. The only time you do not record an observation is if you are sure you recorded that chorus (or individual) at a neighboring stop to avoid counting the same population more than once during a survey night.

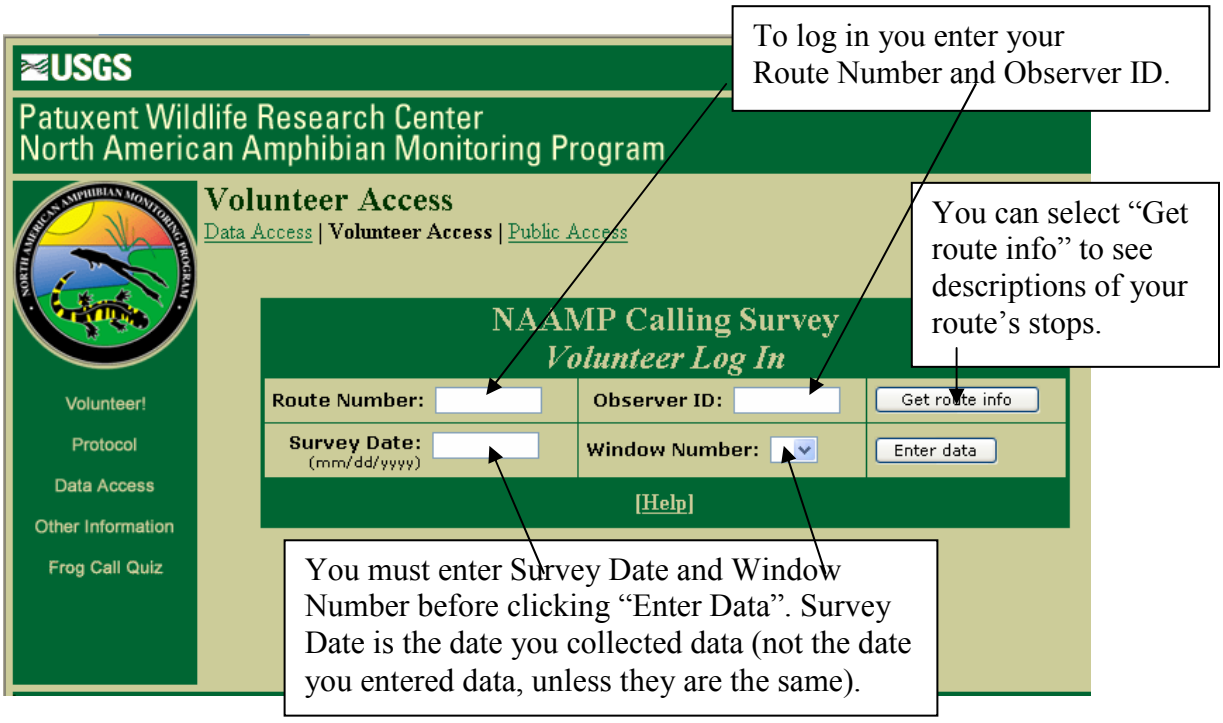
Species ↓ Stop # →	1	2	3	4	5	6	7	8	9	10
Eastern spadefoot										
American toad										
Fowler's toad										
Northern cricket frog										
Green treefrog										
Eastern gray treefrog										
Unknown gray treefrog										
Cope's gray treefrog										
Spring peeper										
Southeastern/western chorus frog complex										
American bullfrog										
Green frog										
Wood frog										
Northern leopard frog										
Southern leopard frog										
Plains leopard frog										
Pickerel Frog										
Crawfish Frog										
Moon or Moonlight Visible: **(y,n)**										
Check if Snow Cover: (optional)										
Number of cars that passed:										

You are also REQUIRED to record if the moon or moonlight is visible at each stop (record y for yes or n for no) and the number of cars passing at each stop. If no cars are seen enter a "0" and if the moonlight is not visible enter an "N". If nothing is entered it will be assumed that this data was not collected. If you have a friend with you on the survey, he or she may count the cars for you.

Data Entry

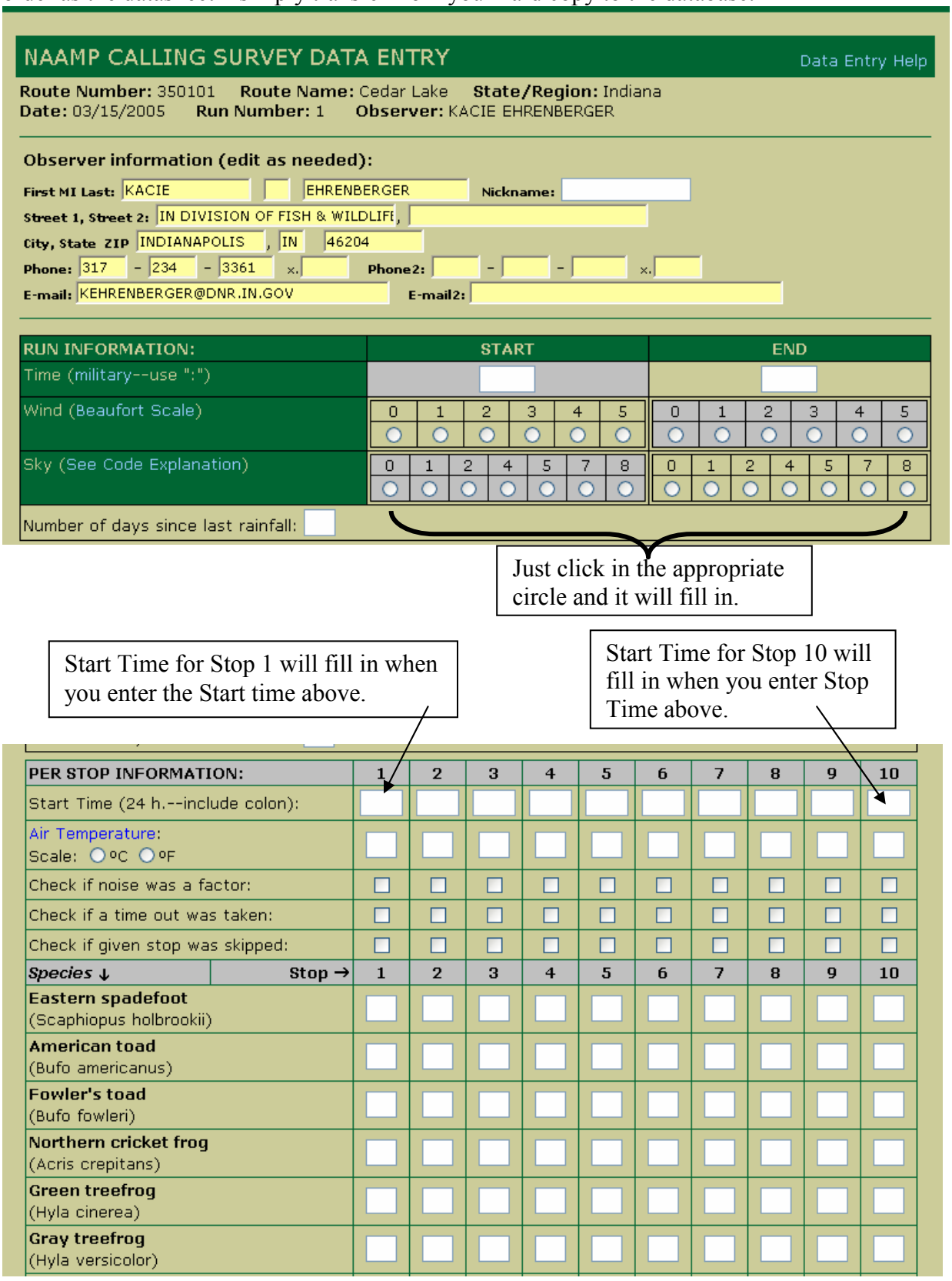
Volunteers are responsible for entering all data into the NAAMP database via the internet. Ideally you should enter your data within a day of collecting information. If you had a rare or new observation (i.e., species calling earlier than usual or a new species is heard for an area) an email is automatically sent to Regional Coordinators when this information is entered into the database. Timely data entry will allow field testing of your data if applicable. All data must be entered and datasheets returned to Regional Coordinators by September 15th. You should retain copies of your datasheet for your records and in case questions arise when the data is reviewed. Datasheets can be returned shortly after each run or returned all together by September 15th.

Database Website: www.pwrc.usgs.gov/naamp/data/

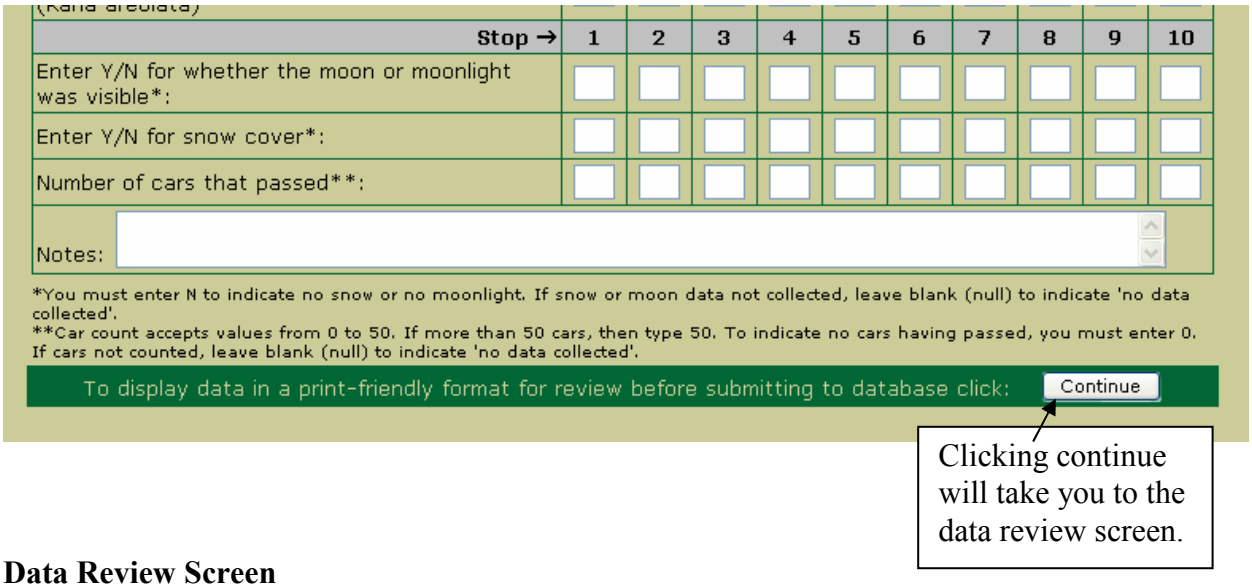


After you click " Enter Data" You will go to a page that keeps scrolling through all the data entry. Each section is separated here. You can move from field to field with your mouse or by pushing the "Tab" button on your keyboard.

The first part is for your information, which should all come up automatically – you can change any personal information here if needed. After this you fill in information in the exact same order as the datasheet – simply transfer from your hard copy to the database.



The rest of the species are listed as you scroll down. At the bottom of the screen enter car and moon information as well as any notes you have.



Data Review Screen

1. Compare each item on the screen with your datasheet to make sure everything is the same.
    a. If there is something wrong click the "Back" button in your Internet browser or click "return to entry form" button in the database.
    b. If everything matches your datasheet then click "Submit to Database" button. You will see a new webpage confirming that your information was received and then the screen will change again to the Log In screen (in case you have more data to enter). Once the data is submitted to the database you need to contact the Regional Coordinators to make any corrections to your data.
2. Please mail your datasheet to the Regional Coordinators. It is important to have the paper copy of the datasheet in case there is a problem with the online system. In addition, the coordinator will double-check the data entry and then archive paper datasheets.
3. Data entry should be completed as soon as possible after data collection. All data must be entered and datasheets returned by September 15th.

Frog Call Quiz

www.pwrc.usgs.gov/frogquiz

USGS has created an on-line resource, the Frog Call Quiz for observer training and assessment.

Your data will not be used for population trend analyses or be publicly available unless you have met quiz requirements. Observers are expected to annually meet the detection index requirements. Anyone who collects data should take the quiz for Indiana. The volunteer assigned to the route is responsible for taking the quiz.

NAAMP participants are being asked to take the quiz for a variety of reasons. The Frog Call Quiz website was created to provide a self-assessment tool for NAAMP participants. By taking the quiz, you will also help us to improve training materials by understanding what species are confusing, assess observer differences over time, and understand what species are difficult to detect in multiple species choruses. By asking all participants to achieve a minimum detection index of 65, **NAAMP is the first long-term large-scale monitoring program to incorporate a standard for participants involved in data collection.**

The Frog Call Quiz includes:

* *Frog Call Look-Up* - a reference section where users can select species by common or scientific name to hear example frog calls and a description of the call. This section also includes state species lists.

* *Public Quiz* - a practice section where users can select a state and then receive a 10 question quiz. Each quiz session is unique, as the sound file library includes several hundred sound files for each state. Each sound file has one or more calling amphibians and users are asked to identify all species on the sound file. The public quiz provides immediate feedback and an opportunity to replay the sound files. **We suggest you practice the public quiz multiple times and take the NAAMP Quiz (see below) when you feel you are comfortable with all the calls and the quiz itself. The Public Quiz has 10 questions with the correct answers after each question.**

* *NAAMP Quiz* - an assessment section available for NAAMP participants only. Login required using the participants Route Number and Observer Number. As with the Public Quiz, each quiz session is unique and each question has one or more calling amphibians. **The NAAMP Quiz has 20 questions, you will see all answers at the end of the quiz.**

Computer Resources
The computer will need to have access to the Internet and be capable of playing sounds (i.e. has a sound card and speakers) in order to hear the frog call sound files. The quiz is designed to work with 56k modems and faster connections. The sound files can only be played by a Real player (sometimes called a RealOne player). This software is available for free and can be downloaded from a link provided on the Frog Call Quiz website.

Minimum Detection Index
Observers need to take the assessment portion of the Frog Call Quiz (the NAAMP Quiz) for their state or region and meet the detection index requirement each year. Observers may retake the NAAMP Quiz as many times as needed to achieve this requirement. Observers are permitted to use any reference materials that would be used while collecting data (the quiz is "open book").

The minimum detection index is 65. The detection index is calculated as ((user's correct responses) - (misidentifications)) / (total possible correct identifications). Since misidentifications are subtracted from a user's correct responses, wild guesses may lower the detection index. It is possible to have a negative value. After achieving the minimum detection index the observer may retake the quiz and the better of the 2 scores will be used.

The NAAMP Quiz will include all species of the state, unless a species is missing from the sound file library. For each quiz session, the program selects sound files based on the species list of the state. Each state has several hundred sound files. Sound files are randomly selected to provide a variety of species. Rare species are treated the same as more common species and may appear more frequently on the quiz than what is expected on survey nights.

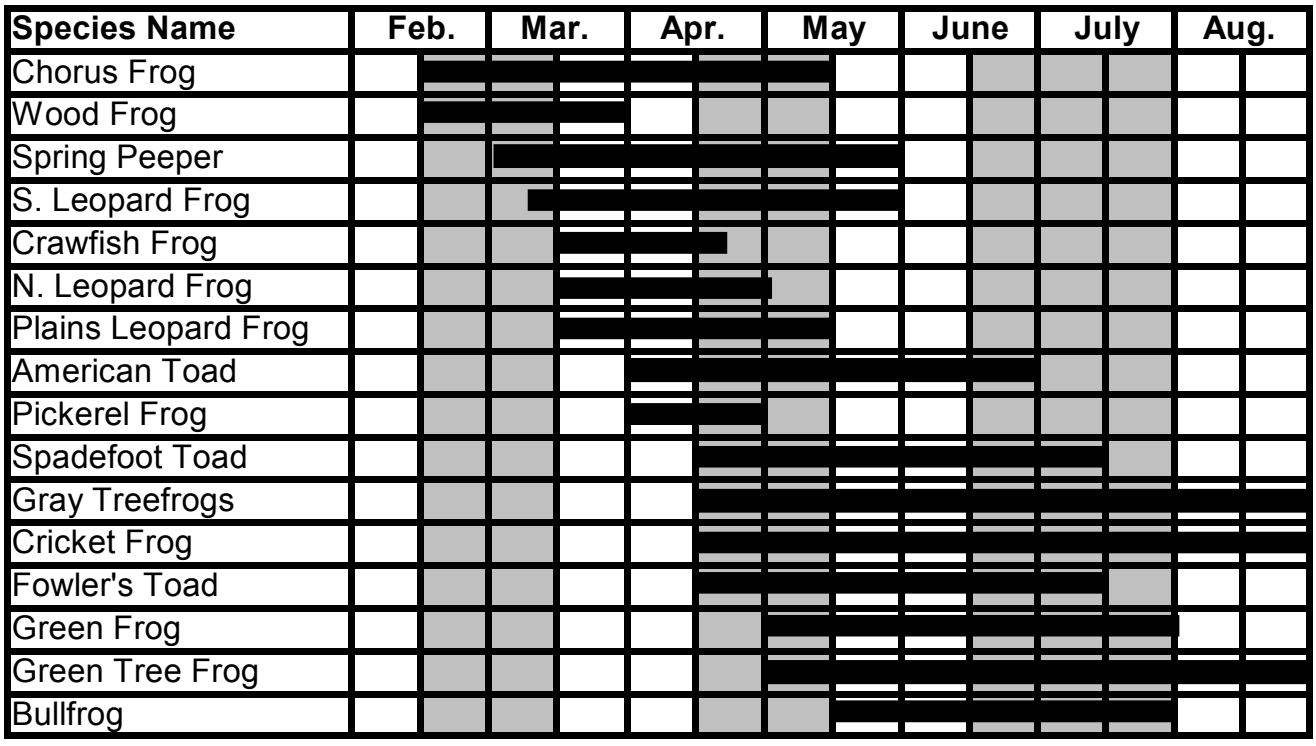
Frog Call Quiz Tips:
- ♬ You can listen to sound files more than once.
- ♬ Each sound file may have one or more species, include in your answer all the species you are confident are on the sound file.
- ♬ Wild guessing will likely decrease your detection index as misidentifications are subtracted from your total number of correct responses.
- ♬ If you are unsure, it may be better to omit an answer than to guess.

Indiana's Frogs and Toads

If you learn what species to expect on your route and what time of year each species calls you will be able to narrow your choices of possible calls for each survey.

Indiana Frog Call Tips	
Species	Call
American Toad	Musical trill, long (20 seconds) high-pitched
Bullfrog	Foghorn, deep bass note slowly repeated
Chorus Frog	Finger over the teeth of a comb, a repeated crrreeeekkk
Cope's Gray Treefrog	Nasally wa-a-a-a, 3 second flute trill, faster and harsher than Eastern Gray Treefrog
Crawfish Frog (endangered)	Guttural sound, snore, hogs at feeding time
Cricket Frog	Sound of metal balls clicked together, shaking a spray can
Fowler's Toad	Nasal waaah, 1-4 seconds, lifeguard whistle
Gray Treefrog	Flute-like trill, slow and melodic, 30 seconds
Green Treefrog	Resembles the queenk, queenk, queenk of a cowbell
Green Frog	Plucked banjo string or tight rubber band
N. Leopard Frog (uncommon)	Rattling snore, 3 seconds, like a heavy door slowly creaking open, occasional chuckling
Plains Leopard Frog (rare)	Chuck-Chuck-Chuck, does not vary in pitch
S. Leopard Frog	Chuckle-like, guttural trills, occasional grunts
Pickerel Frog	Soft, steady snore, 1-2
Spadefoot Toad (rare)	Young crow, explosive grunt
Spring Peeper	Peep, peep, jingle of sleigh bells, can sometimes become a quick trill
Wood Frog	Duck-like quacks, hoarse low-pitched croaking

Indiana Frog and Toad Ranges					
	Statewide	North	Central	South	Range Notes
American Toad	■				Not in lower Wabash Valley
Bullfrog	■				
Chorus Frog	■				
Cope's Gray Treefrog			■	■	North to Muncie
Crawfish Frog			■	■	Endangered western
Cricket Frog	■				Rare in northern IN
Eastern Gray Treefrog		■	■		South to Indianapolis
Fowler's Toad	■				
Green Frog	■				
Green Tree Frog				■	Vanderburg Co.
N. Leopard Frog		■	■		Extreme southeast
Pickerel Frog	■				Not in NW prairie and
Plains Leopard Frog			■		May be extirpated
S. Leopard Frog			■	■	West-central
Spadefoot Toad			■	■	Harrison Co.
Spring Peeper	■				
Wood Frog	■				



Important Websites

NAAMP: www.pwrc.usgs.gov/naamp
NAAMP Data Entry: www.pwrc.usgs.gov/naamp/data/
Frog Call Quiz: www.pwrc.usgs.gov/frogquiz/
Indiana DNR: www.wildlife.in.gov
Wildlife Diversity Section: www.in.gov/dnr/fishwild/endangered/

The following sections are for your reference. Volunteers should not change routes without talking to the Regional Coordinators first.

Stop Inaccessibility, Stop Relocation, and Stop Retirement

1. Stop Inaccessibility: Temporary stop inaccessibility may occur for some transient reason (i.e. traffic accident blocks road access).

A. If only one stop will be missed, then route can be considered complete. The observer should write on the datasheet which stop was missed and note why in the comments section. When entering the data into the database, mark the checkbox indicating which stop was missed.
B. If more than one stop would be missed, the route should be re-run on another night.

2. Stop Relocation: Stop relocation is when a stop needs to be shifted to a new location, after the groundtruthing phase has occurred. During groundtruthing the permanent stop locations are set (see groundtruthing guidelines). Stop relocations should be a rare event.

A. Stop relocation should only occur for safety reasons (i.e. route was safe before-or appeared to be, but perhaps a homeowner fired a gun in the air as warning to observer).
B. Stops should NOT be relocated because of habitat loss or lack of calling amphibians at the site.
C. To relocate (for safety reasons) a stop, the Regional Coordinator should use their best judgment on when it is necessary and where to relocate. If can be moved a short distance away, not impacting the 0.5 mile apart rule this is preferable. If that is not possible, then relocate by creating a new stop at the end of the route and renumbering all the stops. Keep a written record of when, why, and how a stop relocation occurred.

3. Stop Retirement: Once the route has been groundtruthed and listening stations established, these locations are permanent and locations may not be changed unless a safety issue arises. If habitat destruction occurs at a listening station, and a local extinction of amphibians occurs, this is important information. To document habitat destruction the location should be surveyed for

three seasons beyond the destruction date. After three seasons of non-activity, the listening station may be retired, and null data will be assumed for this site. A listening station cannot be retired merely because the wetlands are uninhabited by anurans. Retired stops should be visited periodically to verify that no suitable habitat exists, but five minutes of listening is no longer required.

Groundtruthing Guidelines

If you have a route that has never been run before it will be up to you to determine where stops are located. Once the stops have been determined, they can not be changed except for safety related problems. It is important that you follow the guidelines below. Please contact the Regional Coordinators about any questions related to establishing stops.

Placement of Stops Along Routes
Even for routes that have not been run there are maps with a starting point and initial set of roads randomly chosen. To complete the route 10 stops need to be established. Stops should be chosen based on potential amphibian breeding habitat, not by listening for calling amphibians. Stops need to be at least 0.5 miles apart.

What is considered "potential amphibian breeding habitat"? Amphibian breeding habitat consists of moist areas with temporary or permanent bodies of water. Agricultural fields should be avoided, but livestock impoundments can be suitable if the habitat remains in good condition. When selecting a location look for permanent water, dried areas retaining some aquatic vegetation, or low areas that will hold water throughout the spring.

You should begin at the start point and either set your "trip" odometer to 0 or write down your odometer's mileage and drive until you get to the first habitat. This is Stop 1. Mark the stop on your map and take notes on your surroundings – write down permanent landmarks like bridges, culverts, houses or crossroads. Write down the odometer reading. Now drive 0.5 miles and then keep going until you get to the next habitat. This is Stop 2. Repeat all the steps above until you have 10 stops. Be sure you have sufficient stop descriptions. From your notes, create driving directions using the Site Description form provided to you. Could someone else use your directions to find the stops?

If there are problems with the randomly chosen roads (very busy, construction has altered what the map shows) contact the Regional Coordinators to determine how your route will be altered.

Complete the Stop Description form and return it with a map of your stops to the Regional Coordinators. Retain copies for yourself. From these materials, the national NAAMP office will create the official route map and provide copies back to the Regional Coordinators, who will supply you with a copy. You can begin collecting data once the Regional Coordinators have approved the route (i.e., you do not have to wait on the "official" map).